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## Original Article

## Evaluating COVID-19 vaccine hesitancy: A qualitative study from Vietnam

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## ABSTRACT

**Background and aims:** Vaccine hesitancy is a major threat to COVID-19 vaccination programs. This study aimed to examine the public attitudes towards COVID-19 vaccines, the variance of these attitudes, and associated determinants within a large COVID-19 outbreak in Vietnam.

**Methods:** Two focus group discussions were conducted online with 20 people from different socio-economic and profession backgrounds. Purposive sampling was used to recruit participants. Discussions were recorded and transcribed verbatim. Key themes were extracted using reflexive thematic analysis method.

**Results:** Four distinct, non-static attitudes including acceptance, conditional acceptance, hesitancy, and anti-vaccination were found. Themes identified as determinants of these attitudes were external factors, internal factors, and risk-benefit self-assessment regarding COVID-19 vaccination.

**Conclusions:** We found mixed, non-static COVID-19 vaccination attitudes. People's vaccination risk-benefit self-assessment greatly determines the variance of their attitudes over time. Given high public trust in the authorities, the government should take the lead to counter COVID-19 vaccine misinformation. To increase acceptance, vaccine advertising campaigns should focus on providing information about the dangers of COVID-19, the ability to manage side-effects at the vaccination centers, and updated, precise information on both the outbreak and vaccines. Future research is needed to identify the public most common COVID-19 information channels to enable effective community education.

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## 1. Introduction

The COVID-19 pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has posed a great threat to human physical and mental health [1]. Despite tireless efforts to contain the virus, it continues spreading globally [1]. The development of vaccines is considered an important strategy to curb the spread of SARS-CoV-2 [2,3]. Since April 27, 2021, Vietnam has experienced the fourth COVID-19 wave considered as the first "real wave", with 927,495 cumulative incident cases being reported as of November 2, 2021 [4,5]. In early 2021, COVID-19 vaccine was rolled out to the priority groups including frontline healthcare workers

and those working in the outbreak prevention and control [6]. Subsequently, the Vietnam's largest-ever COVID-19 vaccination campaign started in July 2021 [6]. It is documented that the success of any vaccination program is determined by the public vaccine acceptance [7], which is influenced by various concerns of the public [8].

Available quantitative studies conducted on specific groups in Vietnam found mixed results regarding COVID-19 vaccine acceptance. A study conducted on 425 adults with chronic illnesses found positive beliefs regarding the vaccine, but they were concerned about the vaccine side-effects, essentialness, and cost [9]. A survey conducted on 398 students found that despite their high perception of the importance of vaccination, 17% of them were vaccine-hesitant or refused to be vaccinated [10]. Similarly, another study reported that 39.6% of 651 pregnant women refused to receive the vaccine if it were available for them [11]. Among all these groups, the likelihood of COVID-19 vaccine acceptance is associated with income, self-perceived risk of infection, and perceived risk to

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people [11]. Determinants of vaccination acceptance also include vaccine knowledge, lack of access to information, and cues to action [9,10]. These quantitative surveys help identify people's intentions to get vaccinated against COVID-19 and some associated barriers. However, qualitative research is needed to explore in depth the determinants of vaccine acceptance, the potential interaction of these factors in the context of people's experiences of and reactions to the pandemic [12]. Qualitative research also helps examine the variance of COVID-19 vaccine hesitancy over time and the associated factors of such changes [13]. This approach would assist us in understanding why vaccine hesitancy varies over time and across populations and places, which in turn improves the vaccination program [12]. The presenting qualitative research study examined people's attitudes towards COVID-19 vaccine and associated determinants in Vietnam, bringing in initiatives to improve the vaccination campaign.

## 2. Methods

### 2.1. Study context

Two focus group discussions (FGDs) were conducted in May 2021 when Vietnam experienced the fourth COVID-19 wave, and COVID-19 vaccine was rolled out to priority groups. A few COVID-19 vaccine-related deaths had been reported on local media [14,15].

### 2.2. Study design

Two 1-h focus groups of 10 participants each were organized in line with the accepted methodology [16–18]. A moderator guide comprised of 13 questions was pre-determined covering personal attitude towards COVID-19 vaccines and historical influences; contextual influences; vaccine cost, safety, number of injections; and cues to action (Appendix 1). All questions were developed based on the vaccine hesitancy survey questions developed by the European Center for Disease Prevention and Control and World Health Organization (WHO) [19,20].

Vietnamese residents aged 18 years and above were invited to participate in the study. A diverse sample was selected using the principle of maximum diversity based on a set of key sampling focuses including different socio-demographic parameters (age, gender, socio-economic and education status), working status (students, working people, and retirees), professions (physicians, other health professions, and non-health professions), COVID-19 vaccination status, chronic health conditions, and geographical locations (South, North, and Central Vietnam). The initial participants in each profession were identified by three authors who had significant local knowledge. The purposive sampling technique was used to recruit further participants. When 10 participants had been recruited, gaps in the key sampling focuses were identified, and the remaining 10 participants were recruited to fix these gaps. Given COVID-19 restrictions in Vietnam, the two FGDs were conducted on Microsoft Teams platform. The participants' baseline characteristics were not introduced in the FGDs unless they voluntarily introduced themselves. This aimed to minimize the possibility that those who worked in the health sector would influence other participants. A discussion for each question continued until it reached saturation. The discussions were digitally recorded.

The study was approved by the Phenikaa University Ethics Committee (reference 216/QĐ-ĐHP-KHCN). All participants provided written informed consent by email and re-confirmed consent verbally at the beginning of the discussions [12]. Participants were informed their FGDs would be video-recorded. Those who did not want to be visually seen could turn off their webcam. After the discussions, audio files were separated from the video files and

were subsequently transcribed. Only de-identified information was published.

### 2.3. Analysis

The recordings were transcribed verbatim in Vietnamese and translated into English by the bilingual researcher. All identifying information was removed and participants' names were pseudonymized. By using reflexive thematic analysis [21], authors independently analyzed transcripts for group interaction along with field notes and assigned preliminary codes describing the interview content [22,23]. Then, the results were validated by all authors for consensus. Finally, the first author wrote up the findings and performed sense checking with the remaining authors as necessary. The analysis was inductive and was not structured based on any existing theoretical frameworks. This analysis approach has been validated elsewhere [12].

## 3. Results

### 3.1. Characteristics of study participants

Among 20 participants with a median age of 39 years old (21–66 years old), 13 were females, seven were health professionals, four had chronic conditions, and three was vaccinated (Appendix 2).

### 3.2. Study participants' attitudes towards COVID-19 vaccine and associated determinants

Participants showed mixed attitudes towards vaccine acceptance. Some expressed their strong, positive attitudes (*quotes 1–4, Table 1*), or conditionally accepted the vaccine (*quotes 5–6*). Others felt hesitant (*quotes 7–8*), and few had anti-vaccination attitudes (*quotes 9–13*). Three main themes were identified as determinants of vaccine acceptance (*Fig. 1*).

#### 1. External factors affecting participants' vaccine acceptance

All participants confirmed waiting time at a vaccination center did not affect their vaccine acceptance. However, given the huge economic impact of COVID-19 on individuals, the travel cost associated with vaccination may hinder the community's willingness to get vaccinated (*quote 14*). Although vaccine cost is not the participants' main concern in general (*quote 15*), in the context of a low efficacy COVID-19 vaccine, the high cost would affect their vaccination decision (*quote 16*). Also, with the increasing unemployment rate due to COVID-19 and the income disparity between the rurals and urbans in Vietnam, vaccine cost is strongly believed to be among the disadvantaged people's main determinants of vaccine acceptance (*quotes 17–18*). Other specific groups affected by vaccine cost included ethnic minorities and those living in the rural mountainous areas (*quote 19*). The participants were concerned about the vaccine side-effects in relation to the number of injections and expected a single-dose vaccine (*quote 20*).

Given the participants' concern of the vaccine side-effects (*quotes 21–22*), particularly deaths (*quotes 34, 36*), vaccine acceptance was greatly influenced by the type of a vaccination center with priority given to the prestige and ranking in managing side-effects (*quotes 21–29*). Tertiary public hospitals were acknowledged for being a standard vaccination center (*quotes 21–27*). Private hospitals were the second popular choice (*quotes 26–27*) as they are less overcrowded compared with public hospitals and thus, low risk of acquiring COVID-19. Private health practices were not selected by study participants because it was not safe (*quote 28*).

**Table 1**  
Excerpts of 20 study participants reflecting their attitudes towards COVID-19 vaccination and associated determinants.

Themes and sub-themes	Quote numbers	Quotes	
<b>Study participants' mixed attitudes towards vaccine acceptance</b>			
Acceptance	1	"My family supports me to get vaccinated. However, I decided to be vaccinated regardless of their encouragement" (39-years-old, female non-health professional).	
	2	"I would decide to get vaccinated" (39-years-old, male health professional).	
	3	"If the vaccine is available to me, I will get it" (34-years-old, male non-health professional).	
	4	"I really want to get vaccinated" (39-years-old, male non-health professional).	
Conditional acceptance	5	"I agree to get vaccinated, but it is conditional agreement. This means I will not get vaccinated with any COVID-19 vaccines. My vaccine acceptance is based on my selection of vaccine" (39-years-old, female non-health professional).	
	6	"I would get vaccinated for sure with a condition that I am not allergic to any foods and medications which make me feel somehow assured when getting vaccinated" (39-years-old, vaccinated, female health professional).	
Hesitancy	7	"I am hesitant to take this vaccine" (39-years-old, female non-health professional).	
	8	"I am not ready to be vaccinated like what I was when I got vaccinated with vaccines in the National Expanded Program on Immunization" (34-years-old, female health professional).	
Anti-vaccination	9	"A vaccine that has not been adequately investigated may have some risks (of severe side-effects). Unfortunately, if someone acquires these (side-effects), it will be very bad for him/her and his/her family. Why? For example, I, myself, am still young. What would it be if I got vaccinated and developed severe side-effects or anaphylaxis? My wife lost her husband. My kids lost their father. Is this correct? Therefore, I have not got vaccinated. I work in medical field, and I understand this issue. They asked me if I have any allergy with food or medications during the pre-vaccination screening. I reported I developed allergic reactions after eating silkworm pupae. Indeed, I never eat this and do not have any allergic reaction. The reason is that I fear death ... I declare ... People fear of death. I said this so that they removed me from the vaccination list. There was a published news about a fatal case related to COVID-19 vaccine. At this stage, all my colleagues have got two jabs, but I decided not to get vaccinated" (34-years-old, male health professional).	
	10	"Vaccine just makes our bodies familiar with that issue (the virus). It cannot protect us. I will not get it." (28-years-old, male non-health professional)	
	11	"I do not dare to get vaccinated" (66-years-old, retired, female health professional).	
	12	"I would decide not to get vaccinated" (42 years-old, female non-health professional).	
	13	"I think my thoughts are like those of most Vietnamese people. Even scientists agreed that the COVID-19 vaccine has been produced so fast. Hence, we, being laymen without any knowledge about medicine, fear of risk of death. Obviously, the current vaccine targets the strain circulating last year. There are U.K. strain and Indian strain. Can vaccine protect against these strains? I would continue with the non-vaccine preventive measures, regardless of what people say about the effectiveness of vaccine. Although the risk of developing vaccine severe side-effects is small, I do not want to take risk" (44-years-old, female non-health professional).	
	<b>Theme 1: External factors</b>		
	Travel cost and travelling distance associated with the vaccination and waiting time at a vaccination center	14	"The individual's economy is suffering a severe pain due to the pandemic. Hence, if the travel cost was supported, the number of people getting vaccinated would be higher. In contrast, despite their fear of COVID-19 infection, a high (travel) cost together with a request to travel (for vaccination) would make this number lower" (44-years-old, female non-health professional).
		15	"In general, vaccine cost is an issue, but it is not an important factor affecting vaccine acceptant" (39-years-old, female non-health professional).
	Vaccine cost	16	"In the context of a low efficacy COVID-19 vaccine, the high (vaccine) cost would affect our decision to be vaccinated" (41-years-old, male non-health professional).
		17	"There is a considerably high proportion of people living in rural areas and those who are jobless. Thus, vaccine cost would greatly affect their decision to get vaccinated" (66-years-old, retired, female health professional).
18		"I believe that this (vaccine) cost is a large determinant of vaccine acceptance in the context of Vietnam. This is because there is an income disparity between urban and rural areas. At this stage, the vaccine cost is completely free of charge in Vietnam, but we are not so sure about the next stages. Hence, with people living in rural areas like us who have a low income and/or are jobless, if a job costed around between VND\$700,000 (US\$35) and VND\$2,000,000 (US\$50), the cost for vaccinating a whole family of 5–10 members would be equal to that of a good motorbike" (34-years-old, male health professional).	
19		"I believe that not all Vietnamese citizens have a good income. Minority ethics groups and those living in the rural mountainous areas would not afford the vaccine cost" (38-years-old, female, COVID-19 vaccinated health professional).	
Number of injections	20	"We need two doses of the Covid-19 vaccine which means the risk of developing adverse events following immunization is doubled. If there was a single-dose vaccine being developed, we would consider and wait for this (vaccine) which helps halve the risk" (39-years-old, female non-health professional).	
The nature of vaccination centers	21	"With (COVID-19) vaccines with high risks of developing adverse events following immunization, I prefer to be vaccinated at a public hospital. The doctors' skills and experience and the resources at these facilities (public hospitals) would enable a prompt treatment to save life (in case of developing anaphylaxis)" (39-years-old, female non-health professional).	
	22	"If we worry about our health, it's best to get vaccinated at public hospitals. I will do so as it is a new vaccine with suspected high risk of adverse events following immunization. If it is needed, I can be referred to the well-equipped ICU located inside this tertiary hospital immediately" (39-years-old, female, COVID-19 vaccinated health professional).	
	23	"I would get vaccinated at a vaccination center that is a health facility or more specially, a public hospital" (34-years-old, female, COVID-19 vaccinated health professional).	
	24	"First, the knowledge and skills of healthcare professionals including resuscitation and emergency care at tertiary (public) hospitals are better (than those of non-tertiary hospitals). Second, these tertiary hospitals are well equipped. Although the non-tertiary hospitals can manage emergency cases, severe cases must be referred to a tertiary hospital" (39-years-old, female, COVID-19 vaccinated health professional).	
	25	"I would select hospitals with good facilities, such as Bach Mai, Viet Duc, and Cho Ray (major public hospitals where staff can treat patients with anaphylaxis properly)" (38-years-old, female health professional).	
	26	"To me, I prefer to be vaccinated at a vaccination center that is less overcrowded such as private hospitals, hence low risk of acquiring COVID-19. But these hospitals should have an ability to treat anaphylaxis. However, with special	

(continued on next page)

**Table 1** (continued)

Themes and sub-themes	Quote numbers	Quotes
<b>Study participants' mixed attitudes towards vaccine acceptance</b>		
	27	people like my mom who has underlining health conditions or my kids, I want them to be vaccinated at a public hospital. This makes me rest assured they will be safe if something (side effects) wrong happens because public hospitals are well equipped and have good healthcare professionals" (39-years-old, female non-health professional).
	28	I would get vaccinated at a public hospital or a healthcare facility where medical resources including equipment and staff are adequate. Private hospitals with high reputation should be ok and I do no need to wait for a long time there. I would not get vaccinated at a private health clinic because it is not safe, even the risk of developing (vaccine) side effects may be low" (39-years-old, male health professional).
	29	"The nature of the vaccination center is important. How would they (healthcare professionals) perform a pre-vaccination consultation as well as respond if people developed these events?" (38-years-old, female, COVID-19 vaccinated health professional).
Influences of other people	30	"It is for sure that I want to be vaccinated at a well-equipped hospital with a good reputation that can address all (health) situations" (44-years-old, female non-health professional).
	31	It is my personal decision which is not affected by anyone" (39-years-old, female non-health professional).
	32	"My family supports me to get vaccinated. However, I decided to be vaccinated regardless of their encouragement" (39-years-old, female non-health professional).
COVID vaccine information published on media and government organizations/agencies	32	"There is a risk of developing side-effects and complications with all vaccines. However, I would say that based on the available information about COVID-19 vaccine and the fast production of the vaccine, I hesitate to get vaccinated" (35-years-old, female health professional).
	33	"The mild side effects should not be a problem. However, there are lots of news headlines about shocks developed post-vaccination, and some people developed severe shock. This made me scared and anxious before I got vaccinated" (38-years-old, vaccinated, female health professional).
	34	"I read news about the death of a nurse or a clinical doctor who got (COVID-19) vaccinated and developed ... shock ... anaphylaxis" (28-years-old, male non-health professional).
	35	"There was news about blood clot developed after getting vaccinated" (42-years-old, female non-health professional).
	36	"Published information about vaccine induced shock and death makes me feel indecisive" (40-years-old, male non-health professional).
	37	"I am an elderly and have some underlining health conditions. Hence, I am anxious with the information that vaccine can cause anaphylaxis. I do not dare to get vaccinated" (66-years-old, retired, female health professional).
	38	"Indeed, I was willingness to get vaccinated. However, I heard about the elderly developed side effects post vaccination in Europe. I discuss about this with my colleagues, and all of them said no to vaccination ... I am working from home, and I strictly implement non-vaccination preventive measures. I do not really mean I say no to vaccine, but I am waiting for more information from the Ministry of Health regarding vaccine eligibility, particularly what vaccine is for my mom, my kids, and myself" (39-years-old, female non-health professional).
	39	"I agree to get vaccinated, but it is conditional agreement. This means I will not get vaccinated with any COVID-19 vaccines. My vaccine acceptance is based on my selection of vaccine. Given the current information about the side-effects of AztraZeneca vaccine and my history of allergic reactions, I would not get vaccinated with this vaccine, although I belong to a priority group for vaccination. I am waiting for a better vaccine with ... less risk of severe side-effects. I am not a scientist. I can only wait for this information to be available in the mainstream media. All of these are my personal decision which is not affected by anyone" (39-years-old, female non-health professional).
	40	"Indeed, I really want everyone to get vaccinated, but I do not have enough information to confirm whether vaccine is good for everyone. Hence, I hesitate to recommend vaccination" (38-years-old, female, COVID-19 vaccinated health professional).
	41	"Based on the responsibility of healthcare professionals, I would recommend people to get vaccinated, but at a later stage when more information is available" (34-years-old, female, COVID-19 vaccinated health professional).
	42	"We have not had adequate knowledge about the current (COVID-19) vaccine. I would wait until the effective treatment. I would consider vaccination again if there is more published information about the effectiveness and safety of vaccine" (28-years-old, male non-health professional).
	43	"Although I belong to a prioritized group for vaccination, many side-effects and the un-clear effectiveness of the vaccine are two main reasons for my uncertainty to get vaccinated" (39-years-old, female non-health professional).
	44	"My biggest concern is about the true effectiveness of (COVID-19) vaccine because there are people who have already been vaccinated, with two doses of vaccine acquire infection in many places worldwide. Is the ability to protect us against all viral strains of the vaccine adequate?" (39-years-old, female non-health professional).
	45	"I would decide not to get vaccinated. This is because I work from home. I have less contact with people. I heard that those who got the first dose of vaccine reported their severe tiredness that they had not experienced before. Also, the question is that what the effectiveness of vaccine is provided that there are many COVID-19 strains. Of course, I do not mean that I say no to COVID-19 vaccination. But I expect to have more proper information about vaccine and experience from those who have already been vaccinated to evaluate the safety and effectiveness of vaccine" (42-years-old, female non-health professional).
	<b>Theme 2: Risk-benefit self-assessment regarding COVID-19 vaccination</b>	
	46	"Firstly, the benefit of vaccine is outweighed that of non-vaccination and acquiring infection. Secondly, the rate of vaccine side effects is much lower than that of road traffic injuries and those from daily activities in Vietnam. Hence, it is unable to conclude if COVID-19 vaccine is risky because it is too new" (39-years-old, female, COVID-19 vaccinated health professional).
	47	"I am a healthcare professional. My risk of acquiring the virus is high. Hence, the benefit of being vaccinated is huge. And I would get vaccinated for sure with a condition that I am not allergic to any foods and medications which make me feel somehow assured when getting vaccinated" (39-years-old, female, COVID-19 vaccinated health professional).
	48	"I understand that there are some risks of developing side-effects with vaccination, but they will disappear after a few days. Also, I am registering to work as a volunteer to control COVID-19 in the community. Hence, I agree to be vaccinated" (21-years-old, female health student).
	49	"Indeed, I was willingness to get vaccinated. However, I heard about the elderly developed side effects post vaccination in Europe. I discuss about this with my colleagues, and all of them said no to vaccination ... I am working from home, and I strictly implement non-vaccination preventive measures. I do not really mean I say no to vaccine,

Table 1 (continued)

Themes and sub-themes	Quote numbers	Quotes
Study participants' mixed attitudes towards vaccine acceptance		
	50	but I am waiting for more information from the Ministry of Health regarding vaccine eligibility, particularly what vaccine is for my mom, my kids, and myself" (39-years-old, female non-health professional). "I would decide not to get vaccinated. This is because I work from home and thus, have less contact with people. I heard that those who got the first dose of vaccine reported their severe tiredness that they had not experienced before. Also, I have some experience with vaccination. My kid gets a flu shot every year, but still acquires flu. Hence, the question is that what the effectiveness of vaccine is provided that there are many COVID-19 strains. Of course, I do not mean that I say no to COVID-19 vaccination. But I expect to have more proper information about vaccine and experience from those who have already been vaccinated to evaluate the safety and effectiveness of vaccine" (42-years-old, female non-health professional).
	51	"I am working from home and thus, do not have any contact with strangers. I do not really to get vaccinated to protect myself and the community. Perhaps, I would get vaccinated, but I am waiting for another vaccine. I heard that a developed country recommends people younger than 50 should not get an AstraZeneca vaccine. Hence, I am hesitant to take this vaccine" (39-years-old, female non-health professional).
	52	"I have less contact with people in my job ... Published information about vaccine induced shock and death makes me feel indecisive. I am waiting for more vaccines to be available so that I can select a better one" (40-years-old, male non-health professional).
<b>Theme 3: Internal factors</b>		
Previous experience with non-COVID-19 vaccines	53	"Prior to the COVID-19 pandemic, my boss had been transferred to the ICU after getting a flu vaccine. But this experience does not influence my decision to get a COVID-19 vaccine" (34-years-old, male health professional).
	54	"We all know that there are many adverse events following immunization being reported. I must accept it because its risk is very small. Hence, these negative experiences do not affect my decision to get vaccinated against COVID-19" (35-years-old, female health professional).
	55	"I did not care about vaccine-related events previously. Hence the past vaccine-related events do not influence my decision to get vaccinated against COVID-19" (41-year-old, male non-health professional).
	56	"I have been vaccinated against almost all vaccine preventable diseases since I was a kid including those outside the Expanded Program on Immunization. Hence, I have been familiar with this (vaccines in general) and hoping to be vaccinated against COVID-19 since the beginning of this pandemic. Published news about (COVID-19) vaccine side effects have made people think twice about this vaccination. But I will get (COVID-19) vaccinated when the vaccine is available for me" (32-years-old, male non-health professional).
Vaccine knowledge	57	"There is a risk of developing side-effects and complications with all vaccines. The prevalence of people developing these complications is small ... COVID-19 vaccination is very important for oneself and the community" (35-years-old, female health professional).
	58	"Like other vaccines, we can acquire infection after getting vaccinated. It's normal. But if I do not get vaccinated and do not protect myself from the virus adequately, I will have higher risk of acquiring infection" (34-years-old, male health professional).
	59	"I would get vaccinated. Although being vaccinated is risky, its risk is much lower than that of acquiring infection. Also, if I was infected, I could transmit the disease to the community due to the nature of my job (contacting many people). I think getting vaccinated should be done. There is no need to be afraid" (39-years-old, male health professional).
	60	"Vaccination does provide some levels of protection with the new (COVID-19) strains" (44-years-old, female non-health professional).
	61	"Vaccination is a social responsibility" (35-years-old, female non-health professional).
	62	"Without vaccination, the virus can spread easily in the community. But yes, the recommended non-vaccine preventive measures are needed even post vaccination" (39-years-old, female non-health professional).
	63	"We have been successfully using social distancing and lockdown which are just travel-related measures (to control the outbreak). If the number of vaccinated people increases, each of them will be an immune shield to protect them from infection and to minimize the spread. Without vaccination, we cannot travel anywhere because the risk (of infection) is still there even the outbreak is being control" (32-years-old, male non-health professional).
	64	"We are unable to examine the long-term, negative impact of COVID-19 five to 10 years post vaccination at this stage. However, in the context of the ongoing pandemic with continuous outbreaks and some countries have returned to normalcy, I think vaccination is needed to do so" (34-years-old, vaccinated, female health professional).
	65	"The ability to induce effective immunity of the vaccine is different in different people. And the immunity wanes over time" (39-years-old, vaccinated, female health professional).
	66	"Regarding COVID-19 vaccine, my most concern is about its low effectiveness, which means I wonder whether it can protect us against infection. This is my main determinant of getting vaccinated" (41-years-old, male non-health professional).
	67	"I feel uncertain because this is a new vaccine that was developed so fast and can cause blood blot" (39-years-old, vaccinated, female health professional).
	68	"I think my thoughts are like those of most Vietnamese people. Even scientists agreed that the COVID-19 vaccine has been produced so fast. Hence, we, being laymen without any knowledge about medicine, fear of risk of death. Obviously, the current vaccine targets the strain circulating last year. There are U.K. strain and Indian strain. Can vaccine protect against these strains? I would continue with the non-vaccine preventive measures, regardless of what people say about the effectiveness of vaccine. Although the risk of developing vaccine severe side-effects is small, I do not want to take risk" (44-years-old, female non-health professional).
69	"A vaccine that has not been adequately investigated may have some risks (of severe side-effects). Unfortunately, if someone acquires these (side-effects), it will be very bad for him/her and his/her family ... Therefore, I have not got vaccinated. I work in medical field, and I understand this issue. They asked me if I have any allergy with food or medications during the pre-vaccination screening. I reported I developed allergic reactions after eating silkworm pupae. Indeed, I never eat this and do not have any allergic reaction. The reason is that I fear death ... I declare ... People fear of death. I said this so that they removed me from the vaccination list. There was a published news about a fatal case related to COVID-19 vaccine. At this stage, all my colleagues have got two jabs, but I decided not to get vaccinated" (34-years-old, male health professional).	

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**Table 1** (continued)

Themes and sub-themes	Quote numbers	Quotes
Study participants' mixed attitudes towards vaccine acceptance		
	70	"I am not so sure if it (complications) only occurs a few days post-vaccination or it can occur a longer time later" (39 years-old, female, COVID-19 vaccinated health professional).
Trust in government's non-vaccine responses to the outbreak	71	"Vietnam controlled the outbreak very well, but it does not guarantee that we can do it next time. And our healthcare resources are very limited. If a severe outbreak (of COVID-19) occurred, we would not be able to control it" (39-years-old, female non-health professional).
	72	"We were controlling the outbreak very well ... but a few community cases can create a severe outbreak" (39-years-old, male health professional).

Participants' intention to get vaccinated was not influenced by family members, friends, or colleagues (quotes 30–31). However, the published vaccine-related negative information had a strong impact on participants' vaccine acceptance (quotes 32–45). All participants agreed there was a risk of developing side-effects with all vaccines (quote 32). Regarding COVID-19 vaccines, the non-fatal side-effects were not an issue (quote 33). However, severe side-effects including deaths, shock, and blood clot were major concerns despite the small risk (quotes 33–38). Even those who had been vaccinated felt scared and anxious before getting vaccinated due to the negative information (quote 33). Another important concern was the vaccine's effectiveness provided that people vaccinated with two jabs still acquired infection (quotes 43–45). Participants expected the Ministry of Health and mainstream media cover more information on the COVID-19 vaccine safety and effectiveness to convince them of getting vaccinated (quotes 38–39). Similarly, lack of these information made participants including health professionals hesitant to encourage people to get vaccinated (quotes 40–41).

2. Participants' risk-benefit self-assessment regarding COVID-19 vaccination

Participants felt uncertain because the vaccine was developed so fast and caused severe side-effects (quotes 32–35). The vaccine was also new, and little had been known about the risk of side-effects (quote 22). However, participants recognized that the benefit of vaccine was outweighed that of being non-vaccinated which could lead to infection (quote 46). They understood that the risk of side-effects was small. Hence, it was unable to conclude if COVID-19 vaccine was risky (quote 46). Participants performed their risk-benefit assessment regarding COVID-19 vaccination in relation to the nature of their jobs which may or may not put them at risk of infection. Those who were health professionals or outbreak control volunteers were willing to get vaccinated (quotes 47–48). Contrastingly, those working from home were reluctant but expressed their willingness to get vaccinated if their situations changed and put them at risk of infection (quotes 49–52). Participants also expressed their vaccine acceptance in relation to an evaluation of their health conditions and COVID-19 vaccine types aiming to minimize their risk of developing severe side-effects (quotes 5–6).

3. Internal factors affecting participants' vaccine acceptance

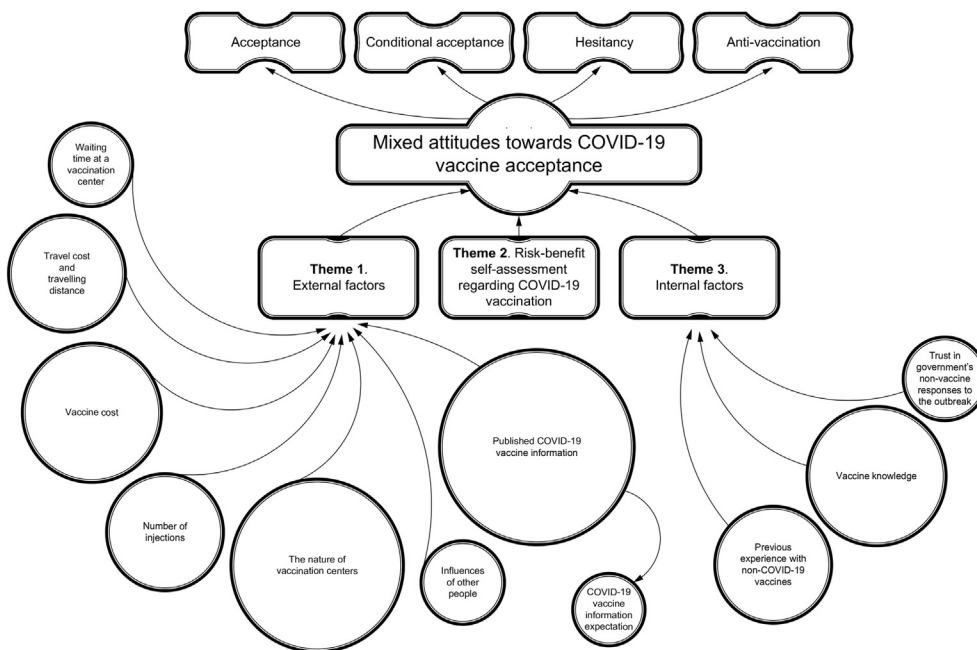
Although participants were not affected by their previous negative vaccination experiences (quotes 53–54), the previous positive experiences were associated with their COVID-19 vaccine acceptance. Those getting paid vaccines previously were willing to accept the COVID-19 vaccine (quote 56). Regarding COVID-19 vaccine knowledge, participants acknowledged a small risk of

developing side-effects and/or acquiring COVID-19 post-vaccination, regardless of vaccines (quotes 57–58). However, the risk of side-effects was much lower than that of acquiring infection (quote 59). They also agreed that the available vaccines provide some levels of protection against the new strains (quote 60). Vaccination was considered a social responsibility provided that infected people can transmit the disease to the others (quotes 59, 61–62), and was an important way to stop the transmission and to resume normal life (quotes 63–64). Participants were aware of the importance of combining vaccine and non-vaccine preventive measures to prevent viral spread despite their high trust in government's current non-vaccine responses (quotes 71–72). However, there were concerns about the vaccine low effectiveness and severe side-effects, and the fast production of the vaccine resulting in uncertainties (quotes 65–70).

4. Discussion

We found a divergence in attitudes toward COVID-19 vaccination including acceptance, conditional acceptance, hesitancy, and anti-vaccination. Our findings are in accordance with studies conducted on Australian adults and Irish pregnant women that found mixed attitudes towards the vaccines [24,25]. Of the negative attitudes including conditional acceptance, hesitancy, and anti-vaccination, those with the first attitude are highly likely to accept the vaccine if their conditions have been met. Our finding shows the conditions included the participants' health conditions that may not put them at risk of developing side-effects post vaccination and their COVID-19 vaccine reference. The quality of the vaccine manufacturing and health conditions were also documented in the Australian study as reasons for not getting the vaccine straight away [24]. In Vietnam, recent studies have been conducted on specific populations including healthcare workers, people with chronic diseases, pregnant women, and university students [9,26–28]. However, these studies mainly examined the two attitudes including vaccine acceptance and hesitancy and have not fully explored if a conditional acceptance and anti-vaccination are present [9,26,27]. The only survey conducted on 398 Vietnamese university students found similar mixed attitudes towards COVID-19 vaccines [28]. Hence, research examining COVID-19 vaccine acceptance in a diverse population is needed.

It is suggested that a distinction should be made between anti-vaxxers and vaccine hesitators because most community vaccine engagement campaigns mainly focus on the vaccine hesitators [29]. The reasons behind anti-vaccination views include religious and political beliefs, as well as concerns about the vaccine safety and effectiveness [30], of which the last two issues were the reasons of our participants' anti-vaccination attitudes. Along with anti-vaccination attitudes, we noticed the anti-vaccination behaviors among our participants, regardless of their medical professions.



**Fig. 1.** Study participants' attitudes towards COVID-19 vaccination and associated explanatory themes.  
Footnote: Circle sizes visually represent the level of impact of sub-themes on themes.

Providing scientific evidence refuting vaccination myths is proven ineffective to address anti-vaccination attitudes [31]. A clearer and concise evidence-based communication to the public is suggested to counter people's anti-vaccination attitudes [30,32]. It is also important to highlight facts about the dangers of the disease instead of confrontationally going after anti-vaccination groups [31,33].

We found three main groups of determinants with different levels of impact on participants' attitudes including internal and external determinants as well as the risk-benefit self-assessment regarding COVID-19 vaccination. Regarding the external determinants, vaccine hesitancy could be largely attributed to the low ranking of the vaccination centers and published negative vaccine information. Although public hospitals play the key role in serving the community in Vietnam, private hospitals provide more than 60% of outpatient services [34]. In addition, private outpatient clinics and communal health centers are important entry points into the health system [35,36]. Like other studies [12,24], our participants were very concerned about the risk of severe side-effects despite their understanding of this small risk. Hence, considering their safety, they referred to get vaccinated at published and/or private hospitals with a good reputation because these health facilities can manage side-effects if they occur. Based on our observations, to rapidly reach high COVID-19 vaccine coverage, the vaccine rollout in Vietnam is using a combination of the public hospitals, field vaccination centers, and mobile vaccination stations. Considering our findings, the vaccine advertising campaign should provide more information to reassure the public regarding the capacity of certified vaccination spots in managing vaccine side-effects.

The COVID-19 vaccines may cause severe side-effects such as blood clots [37]. However, in the COVID-19 infodemic, there is an overabundance of information including official recommendations and false or misleading information on social media that hinder the public health responses including vaccination [38]. Published information on the severe side-effects of vaccine including deaths resulted in fears and anxieties among our participants and

prevented them from getting the vaccines or recommending people to get vaccinated. Our participants encountered a range of misinformation which leads to confusion, distress, and mistrust [12]. We found an expectation to have more information on the vaccine safety and effectiveness from the Ministry of Health and mainstream media, which may help strengthen vaccine confidence. The WHO has emphasized that managing the infodemic is a critical part of controlling the COVID-19 pandemic [38]. Given that the authorities' management of the mainstream media in Vietnam [39,40], while the "dynamism of Vietnamese online communities" is rising [41], our findings highlight the high public trust in the governments and the importance of measures to counter vaccine misinformation. We believe that future research is crucial to identify the public common COVID-19 information channels which can help in promptly providing correct information to the public.

Travel and vaccine costs as well as number of injections has some influences on our participants' vaccine acceptance. It is documented that some people want to wait until the single-dose vaccines are available due to a fear of needles [24]. Similarly, our participants expressed an interest in single-dose vaccines due to the fear of risk of side-effects after each jab. At present, the COVID-19 vaccine is free for all Vietnamese and is provided through both hospital-based and field centers as well as mobile stations. These initiatives would ease the cost concerns. However, an annual booster shot may be needed to ensure proper immunity [42]. Given the low income with an average of US\$293 per month in Vietnam [43], an affordable vaccine cost would be a long-term solution to ensure vaccine coverage in the community.

Our participants' intention to get a COVID-19 vaccine was influenced by their own risk-benefit assessment which is a dynamic factor. Indeed, people' willingness to accept a vaccine is not static, relying on the epidemic phase and perceived risk of acquiring infection [44]. Our findings concur that participants who did not intend to get the vaccine expressed their willingness to accept the vaccine if their situations changed and put them at risk of acquiring COVID-19. We also found that vaccine knowledge is an important internal determinant having mixed influences on attitudes towards



COVID-19 vaccine among our participants. A previous study found no association between vaccine knowledge levels and positive attitudes [2]. However, another study found that vaccine hesitancy was attributed to personal knowledge, which had been amplified by recent exposure to published information [12]. Also, the more confused people feel during COVID-19, the more likely they are to be hesitant to accept the vaccine [12]. Hence, it is crucial to provide updated and precise information on both the disease outbreaks and vaccines to enable the public to make their own decision on vaccination.

Our study has some limitations. Interviews were running at the beginning of the fourth COVID-19 outbreak in Vietnam which may have impacted on participants' vaccine attitudes. However, we have identified a dynamic theme that can help predict the variability in vaccine acceptability over time. Although we selectively included participants from a diverse socioeconomic and profession backgrounds, findings that are derived from only two FGDs may not be widely generalizable.

In conclusion, we found mixed, non-static COVID-19 vaccine attitudes which are influenced by people's risk-benefit self-assessment regarding vaccination. Our findings highlight the importance of the government's measures to counter COVID-19 vaccine misinformation. The vaccine advertising campaign should focus on providing information about the dangers of COVID-19, the ability to manage side-effects at the vaccination centers, and updated, precise information on both the outbreak and vaccines to enable the community decision-making regarding vaccination. To enable effective community education, future research is needed to identify the public most common COVID-19 information channels.

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#### CRediT authorship contribution statement

**Minh Cuong Duong:** Formal analysis, Data curation, Funding acquisition, Writing – original draft, Writing – review & editing, conceived the study, developed the protocol, collected and analyzed data as well as interpreted the findings and wrote the paper. All authors reviewed the paper for important intellectual content. **Hong Trang Nguyen:** Formal analysis, Data curation, Funding acquisition, Writing – original draft, Writing – review & editing, developed the protocol, collected and analyzed data as well as interpreted the findings and wrote the paper. All authors reviewed the paper for important intellectual content. **Mai Duong:** Formal analysis, Data curation, Funding acquisition, Writing – original draft, Writing – review & editing, developed the protocol, collected and analyzed data as well as interpreted the findings and wrote the paper. All authors reviewed the paper for important intellectual content.

#### Declaration of competing interest

The authors declare no relevant conflicts of interest or financial relationships.

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.dsx.2021.102363>.

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